



# Agroforestry Systems for Resources Conservation and Livelihood Security in Lower Himalayas

• Pankaj Panwar • A.K.Tiwari • K.S. Dadhwal



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*Editors*

**PANKAJ PANWAR**  
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## PREFACE

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The Lower Himalayas also known as the Shivalik ranges cover a large portion of Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Punjab and Haryana states of north-west India. The region covers an area of 2.14 million ha and forms strips, which stretches 530 km in length with width varying from 25 to 95 km. Once covered with lush green dense forest cover, most of the Shivalik hills today represent eroded ravines, barren slopes and ugly scenes. Every year enormous quantity of soil is eroded resulting in the rise of riverbeds and siltation of tanks, reservoirs and other natural water bodies. Only 18 per cent of the cultivated area in Shivaliks is irrigated. At present Shivaliks are the hot spot of erosion in the world. Soil erosion greater than  $80 \text{ t ha}^{-1}\text{yr}^{-1}$  have been recorded from denuded hills at places. In one of the assessment for erosion from Himachal Pradesh, soil loss up to  $682 \text{ t ha}^{-1}\text{yr}^{-1}$  has been estimated in the lower Himalayas. Hence the need is to arrest soil, water and nutrient losses for resource conservation and sustainable production and for that agroforestry is one of the viable option for Shivaliks.

Agroforestry has become a widely used 'term of art' in agriculture and forest policy. It also has become a widely used political and public relation tool. National Agriculture Policy 2000 of India has emphasized the need for diversification in agriculture through agroforestry. Similarly, the Task Force on Greening India for Livelihood Security and Sustainable Development, cover Joint Forest Management and Agroforestry as the viable options. Today agroforestry has become an important land use strategy and has emerged as one of the sustainable option of land management.

Research institutes, universities and other research organizations working in the region are strongly recommending agroforestry as a viable option for such undulating, rainfed and erosion prone areas. Taking into

account the importance of agroforestry in livelihood security and resource conservation in Shivaliks, it was thought to club the work done in different organizations on the subject so that a ready reference of literature for researchers, planners and other inquisitive reader is available.

We feel that the authors of the chapters have done justice in compiling, collating and synthesizing the research and technologies developed in their respective regions and area of specialization. The book will certainly benefit the researchers, progressive farmers, policy makers and other development agencies. We appreciate the commitment of the contributing authors.

We wish to thank all the contributors for complying with the time schedule and bearing with the persistent requests and queries made by us. We would like to extend our deep appreciation to former Director Dr. V.N. Sharda, Central Soil and Water Conservation Research and Training Institute, Dehra Dun for his continuous guidance and support.

**Pankaj Panwar  
A.K. Tiwari  
K.S. Dadhwal**

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# Agroforestry Systems for Resources Conservation and Livelihood Security in Lower Himalayas

Shivalik ranges cover an area of about 2.14 million ha in Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Punjab and Haryana States of north-west India. Over exploitation of the resources in the region had lead to soil erosion resulting in the rise of riverbeds, siltation of tanks, reservoirs and other natural water bodies. Soil erosion greater than  $80 \text{ t ha}^{-1} \text{ yr}^{-1}$  have been recorded from denuded hills at places. More than 70 per cent people of the region are dependent on agriculture, however, only 18 per cent of the cultivated area is irrigated.

Agroforestry where tree and crops are integrated with each other had been recommended world wide to check soil erosion and simultaneously achieve production goals. Adoption of scientifically proven agroforestry systems in Shivaliks can reverse the degradation and improve the economic status of the farmers of the region. Extensive research had been done till date on role of agroforestry in resource conservation and livelihood security in the region. The book is an attempt to compile the available knowledge on the subject. There are 20 chapters in the book covering various topics relating agroforestry systems with soil and water conservation, livelihood security, slope protection through mechanical and vegetative measures, fertility build up, mine spoil rehabilitation, bamboos, climate change and carbon sequestration.

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